NOTE XV.

ON TWO NEW SPECIES OF DECAPOD CRUSTACEA

BY

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Callianassa audax, n. sp.

Two females, collected in 1892 in the Strait of Malacca and presented by Mr. Tydeman to the Zoological Museum of the University of Utrecht, belong to a new species, much resembling *Call. gigas* Dana in its outer appearance and related also to *Call. novae-britanniae* Borr. from New Britain, to *Call. kraussi* Stebb. from the Cape of Good Hope and to *Call. mauritiana* Miers from Mauritius.

Sutures of the carapace deep. Rostrum minute, measuring one-sixth of the length of the eye-stalks, broader at its base than long and rather obtuse; a still smaller, rounded projection between the eye-stalk and the antennal peduncle. Eye-stalks almost as long as basal antennular article, about twice as long as broad at their base, with subacute tips; corneae black, situated in the middle at the outer side. Second antennular article one and a half as long as thick, third article one-fourth longer than the second; flagella of equal length, a little more than one and a half as long as the peduncle. External antennae one and a half as long as the inner and as the carapace, antennal peduncle a little longer than that of the inner antennae. External maxillipeds resembling those of *Glypturus Branneri* Rathb. (vide: Proc. Wash. Acad. Sc. II, 1900, p. 150, pl. VIII, fig. 7), but the carpus distinctly less wide than the propodus; no spinous crest on the inner face of the ischium, propodus a little wider than long, dactylus slightly compressed.

Legs of the 1st pair very unequal. Merus of larger leg with the lower margin widened to a little beyond the middle and finely denticulate by 13 or 14 small, acute teeth. Carpus about as long as the merus and nearly as long as broad; outer- and inner surface slightly convex, smooth, margins entire though appearing very finely serrate at the inner side. Chela twice as long as the carpus, palm one-third longer than the carpus, upper margin carinate to a little beyond the middle; outer and inner face of the palm smooth; fingers half as long as the palm, shutting close together and rather coarsely granulate.

Small cheliped quite smooth, much narrower than the larger, like in *Call. gigas* Dana. Merus somewhat ovoid, twice as long as broad, unarmed. Carpus one-third longer than the merus, 3-times as long as wide, both margins straight and parallel. Chela a little shorter than the carpus, palm very slightly longer than the fingers.

The 2nd legs closely resemble those of *Call. armata* A.M.-Edw. (Nouv. Arch. du Muséum, VI, 1870, pl. I, fig. 8).

Propodus of 3rd legs with a rounded lobe on the hinder edge; anterior part one and a half as wide as the posterior lobe, posterior margin straight.

Abdomen broad and depressed. Second somite one-third longer than the first and slightly broader than long. Sixth somite one-third broader than long, rather strongly convex transversely. Telson much shorter than the 6th somite and one and a half as broad as long; lateral margins slightly bent, posterior margin truncate, though faintly undulate. Uropods much longer than the telson. Inner uropod triangular, subacute, almost twice as long as wide, with the outer margin straight and the inner slightly curved. Outer uropod regularly oval, one and a half as long as broad, with the margins regularly rounded; outer branch not projecting beyond the inner branch.

Outer rami of the pleopods of the 3rd to 5th somites sickle-shaped, inner rami presenting the form of a rectangular triangle, two sides of which are equally long and straight, while the hypotenuse is slightly curved; outer rami much longer than the inner.

Length 67 mm., carapace 17,5 mm. long, measured in the median line.

Palaemon (*Eupalaemon*) *Lenzii*, n. sp.

Four male specimens collected by Mr. Greshoff many years ago in the river Congo, probably near Boma, and preserved in the Zoological Museum of the University of Utrecht.

Through the courtesy of Professor H. Lenz, Director of the „Naturhistorisches Museum" in Lübeck, to whom I have the pleasure to dedicate this new species, I was enabled to examine a cotype, an adult male, of *Pal.* (*Eupalaemon*) *dux* Lenz from Avakubi upon Ituri, Equatorial Africa. I must in the first place draw attention to a rather confusing inaccuracy in the description of this species in: „Wissenschaftl. Ergebn. der Deutschen Zentral-Afrika-Expedition 1907—1908, Bd. III, Zool. I, Lief. 3, Leipzig 1910, S. 9, Taf. III, Fig. 2—5." About the rostrum, we read that no tooth stands on the carapace: „kein Zahn auf dem Cephalothorax"; this, however, is quite wrong, because in the cotype, the rostrum of which fully agrees with the figure 2 of the cited paper, the 1st tooth is placed on the carapace, while the 2nd is situated just above the orbital margin, so that the tip reaches just beyond it; the 1st tooth is situated at the anterior fifth of the carapace. It is, of course, a slip of the pen that the length of the rostrum is said to be 33 mm. and that of the carapace 14,5 mm. When sending the cotype, Dr. Lenz informed me that he had still received a specimen of *Pal. dux* from a tributary of the Rio Benito, a small river in Spanish Guinea.

The four specimens collected by Mr. Greshoff, are of unequal size. The largest specimen is about 85 mm. long; in this specimen the carapace, which is smooth, and the rostrum, measured from the orbital margin horizontally backward respectively forward, prove to be respectively

$22^1/_4$ mm. and 15 mm. long, while the straight distance between the 1st rostral tooth and the tip of the rostrum is just as long as the distance between this tooth and the posterior margin of the carapace. In the three other, younger, specimens the 1st rostral tooth is a little farther remote from the tip of the rostrum than from the hinder edge of the carapace. While in these younger specimens the rostrum attains the obtuse tips of the scaphocerites, it extends in the largest male to midway between these tips and those of the lateral terminal spines. As in *Pal. dux* the upper margin of the rostrum curves downward, while the tip projects either horizontally forward or appears very slightly turned upward; just as in this species no teeth of the upper margin prove to be situated in a higher level than the 1st rostral tooth, when the upper border of the carapace is placed horizontally. Different from *Pal. dux*, the rostrum appears less high, the distance between the lateral crest and the upper margin being much higher in that species than in *Pal. Lenzii.* In the largest specimen the rostral formula is $\frac{\frac{2}{8}+1}{4}$. The upper margin is armed with 9 teeth, 2 of which are on the carapace, while the 3rd is situated immediately before the orbital margin; the 2nd tooth is almost one and a half as far remote from the 1st as from the 3rd, the 3rd to the 7th are equidistant, the distance between the 7th and the 8th is a little larger than the distances between the 3rd to the 7th; the foremost or apical tooth finally, is situated close to the tip, its distance from the penultimate tooth being one-third longer than the distance between the 7th tooth and the 8th and 4-times as long as its distance from the tip. The lower margin is armed with 4 rather prominent teeth, the 1st situated just below the 7th of the upper margin, the 4th just midway between the apical tooth and the penultimate. The rostrum arises immediately before the middle of the carapace: the distance ($3^1/_4$ mm.) between the tip of the 1st tooth, measured at the level of the orbital margin, from this margin is nearly one-sixth the distance (19 mm.) between this tip and the posterior margin of the carapace.

In the second male, which is 79 mm. long, the rostral formula is $\frac{\frac{2}{8}+2}{5}$. The 3rd tooth is situated above the orbital margin, its tip reaching just beyond it; the 3rd to 8th teeth are equidistant, but one observes 2 apical teeth, the foremost quite near the tip and the distance between the two apical teeth is half as long as the distance between the posterior apical tooth and the antepenultimate or 8th tooth. In this specimen the lower margin carries 5 teeth, the 1st just below the 6th of the upper margin, the 5th opposite the posterior apical tooth. In the third male, which is only a little younger than the second, there are also 5 teeth on the lower margin, but, like in the largest specimen, one observes on the upper margin 8 teeth and 1 apical tooth, the 3rd tooth situated above the orbital margin; the anterior tooth of the lower margin is placed a little behind the apical tooth. The formula for this male is therefore $\frac{\frac{2}{8}+1}{5}$, that of the youngest specimen, which is 68 mm. long, again $\frac{\frac{2}{8}+1}{4}$, like in the largest. The arrangement of the upper teeth is also the same, but the 4th tooth of the lower margin is situated nearer to the apical tooth. In *Pal. dux* the 2nd tooth is already situated above the orbital margin, and the teeth both of the upper- and of the lower margin are smaller, less prominent than in *Pal. Lenzii*, their posterior margin being longer with regard to the anterior.

In *Pal. dux* the rather small hepatic spine is placed only a little before the level of the 1st rostral tooth; in *Pal. Lenzii*, however, this spine is a little larger and situated just beneath the middle of the distance between the 1st and the 2nd tooth, except in the third male, in which this spine is placed just below the 2nd tooth.

The telson appears a trifle wider at its base in proportion to its length than in the cotype of *Pal. dux*, and, while in this species the anterior pair of spinules is situated just behind the middle of the telson, it is placed in *Pal. Lenzii* immediately before the middle, and the posterior pair appears in the four specimens a little farther distant from the acute tip of the telson than from the anterior pair. Tip of the telson as in *Pal. dux*, but one observes 10—12 feathered setae between the inner spines.

The damaged, short antennular flagellum, which is also serrate, seems to agree with that of *Pal. dux*. The basal undivided part of the outer flagellum consists of 8 articles; the two distal articles are only partly separated, namely at the inner side, while the first or basal article appears nearly as long as the four following, which are much wider than long, taken together. In the largest specimen the external maxillipeds project with two-thirds of their terminal joint beyond the apex of the antennal peduncle, in the younger specimens with half that joint.

Legs of the first pair as in *Pal. dux*. In the largest male these legs exceed with two-fifths of the carpus the tip of the scaphocerites; the carpus (12,75 mm.) is almost 2,5-times as long as the chela (5,25 mm.), just as in *Pal. dux*, these numbers being in the cotype respectively 14 mm. and 5,8 mm. The fingers are as long as the palm or slightly shorter.

The second legs resemble those of *Pal. dux*, as regards their general appearance, the relative measurements of the joints and their toothing, but they are distinguished by the different spinulation. In all the specimens the two legs of the second pair are slightly unequal, usually the left is the larger, in the second male, however, the right. In the largest specimen the meri of both legs extend to the end of the scaphocerites, in the others only to the apex of the antennular peduncles. For the measurements I refer to the Table. Looked at from the outer side, the merus appears to increase regularly in diameter to the distal end, but when looked at from the upper surface it shows its greatest diameter at one-fourth of its length from the apex, while this greatest diameter is about one-fifth the length of the joint. The length of the carpus is in proportion to the length of the merus about as 14: 11; the carpus grows slowly thicker to the distal end and is 6-times or almost 6-times as long as thick near the propodal articulation. The chela is about twice as long as the merus, while the palm is usually a trifle shorter than the carpus, in the larger left leg of the largest male, however, a trifle longer than it. The palm, which near the carpal articulation is not wider than the carpus, but even a trifle less wide, is about 6-times as long as wide and usually appears, at the anterior fourth of its length, slightly less wide than near the carpal articulation and near that of the fingers; the palm appears almost cylindrical, though it is in the middle, in all the specimens, a trifle less thick than wide. When looked at from the outer- or from the inner side, the chela proves to decrease regularly in thickness from the carpal articulation to the tips of the fingers, like in other species. The fingers that measure a little more than two-thirds the length of the palm, are slightly turned inward, so that the inner border of the chela appears slightly concave at their articulation with the palm. The fingers shut together, except along the toothed part, while the tips are crossing; they show nearly the same width along their whole length to near the tips. The toothing of the fingers is quite the same as in *Pal. dux*, each finger being armed with 3 teeth, but I wish to observe that in the largest specimen the immobile finger of the left leg shows the trace of a 4th tooth between the 1st and the 2nd.

The second legs are covered with small spinules, though not very thickly. On the inner and lower side of the meri these spinules are larger than on the upper side and on the outer face they are almost wanting at all. The carpal joints are everywhere beset with spinules, which however, like on the meri, are larger and less numerous on the inner- and lower side. Two more or less distinct rows of larger spinules exist on the inner border of the palm and these rows, between which no spinules occur, are continued to the end of the immobile finger; on the palm these spinules are farther distant from one another than on the immobile finger. The spinules on the outer border of palm and fingers are much smaller, like those of the upper surface, while the spinules of the lower are hardly larger. Except the short and fine setae which, like in other species, are observed near the prehensile edges of the fingers and a few of which exist also here and there on the chela and on the other joints, these legs appear quite glabrous.

In the cotype of *Pal. dux* the right leg of the 2nd pair is very small and seemingly regenerated, the left leg is quite normal and appears to be that leg the chela of which is represented in the figure 4. As regards the relative measurements, the second legs of this species nearly accord with those of *Pal. Lenzii*, for the fact that the palm appears relatively longer, namely one-fifth longer than the carpus, may perhaps be explained by the larger size of the described legs; for, as is proved by the Table of measurements, also in the four specimens of *Pal. Lenzii*, the palm appears comparatively longer in proportion to the carpus, the older the specimens are. In *Pal. dux* the fingers show a different form: between the foremost tooth and the tip they distinctly taper and the tips are much more strongly curved inward. As regards the spinulation the meri and the carpi nearly agree with those of *Pal. Lenzii.* On the outer border of the palm we observe, however, in *Pal. dux* a single, quite conspicuous row of spinules which runs from the carpal articulation to that of the dactylus and which is continued almost to the extremity of this finger; these spinules, which, in the middle of the palm, are placed perpendicularly to the longitudinal axis of the chela, are much larger than the minute spinules of the upper- and of the lower surface, from which spinules they are separated by a smooth interspace. On the inner border of the palm not two parallel rows of spinules are observed, as occur in *Pal. Lenzii*, but only one single row and the spinules of this row that are rather far remote from one another, rather irregularly placed and all directed forward, show about the same large size as the large spinules on the outer border, but they are more acuminate. These spinules are continued to the end of the immobile finger, on which they are arranged much closer together. The spinules of the upper surface of the palm like those of the lower, that are but a little larger, are much smaller than the large spinules on the outer and on the inner border. I will, finally, add that one observes in this species on the lower side of the fingers, just near the cutting-edge, between the anterior tooth and the tip, 14 or 15 acute, conical spinules, which are larger than the surrounding and placed perpendicularly to the finger. The spinules which are observed here in *Pal. Lenzii*, are not larger than the others and are not perpendicular, but directed forward towards the distal end of the fingers.

In the largest specimen the third legs project with $^1/_{11}$ of the propodus beyond the tip of the scaphocerites, in the following specimens these legs are a little shorter and in the youngest one they reach just to the tip of the scales. In the largest male the meri, 12 mm. long and 1,3 mm. thick, are 9-times as long as thick, the propodi which are 11 mm. long and 0,8 mm. wide in the middle, 13 to 14-times as long as wide; dactyli one-third of the propodi. The meri of the third legs bear two parallel rows of very small spinules on their posterior margin and a few spinules occur also on the inner side, but the outer side is almost smooth; 7 or 8 somewhat longer spinules exist on the posterior margin of the propodi. On the meri of the fourth legs the spinules are still less developed and those of the fifth are nearly smooth. The three posterior legs of *Pal. dux* show nearly the same relative measurements.

Table of measurements of the second legs in millimeters.

	N°. 1		N°. 2		N°. 3		N°. 4	
	Left leg.	Right leg.	Left leg.	Right leg.	Left leg.	Right leg.	Left leg.	Right leg.
Length of the merus	16	16	12	13	11	11	10	10
Greatest diameter . .	3,4	3,4	2,75	2,7	2,25	2,2	2,25	2
Length of the carpus	21	20	15,5	16,5	15	13,5	13	13
Diameter at the distal end	3,7	3,4	2,75	3	2,5	2,3	2,3	2,2
Length of the chela	37	33	25	27	23	21,5	20,5	19,25
„ „ „ palm	22	19	14,5	16	13	12	12	11
„ „ „ fingers	15	14	10,5	11	10	9,5	8,5	8,25
Width of the palm in the middle	3,6	3,2	2,5	2,7	2,4	2	2,25	2
Thickness of the palm in the middle . . .	3,25	2,75	2,25	2,5	2,25	1,9	2,1	1,9

Pal. (*Eupalaemon*) *Foai* Cout. (H. Coutière, in: Bull. Mus. Paris 1902, N°. 7, p. 517), a species which inhabits the Upper Congo, and which has also been recorded from the river Kribi, from Cameroon and from the river Benito, is apparently a closely related form, but differs by the rostrum in which only one of the upper teeth is situated on the carapace. The carpus is usually one and a half as long as the merus, and therefore comparatively a little longer than in *Pal. Lenzii*, while the fingers, which are hardly more than half as long as the palm, are comparatively shorter than in this species.

Another species, which is as closely related, is *Pal.* (*Eupalaemon*) *macrobrachion* Herklots, which, however, is at once distinguished by the fingers of the second legs being thickly covered with hairs and tomentose.

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